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NOTICE OF ALLOWANCE AND FEE(S) DUE

23363 7590 03/30/2011
CHRISTIE, PARKER & HALE, LLP
PO BOX 7068
PASADENA, CA 91109-7068

EXAMINER

HU, HENRY S

ART UNIT

PAPER NUMBER

1764

DATE MAILED: 03/30/2011

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/594,997	01/24/2007	Takahito Itoh	66296 / L550	3293

TITLE OF INVENTION: SOLID-STATE POLYMER ELECTROLYTE MEMBRANE, METHOD FOR MANUFACTURE THEREOF AND
SOLID-STATE POLYMER ELECTROLYTE FUEL CELL THEREWITH

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	NO	\$1510	\$300	\$0	\$1810	06/30/2011

THE APPLICATION IDENTIFIED ABOVE HAS BEEN EXAMINED AND IS ALLOWED FOR ISSUANCE AS A PATENT. PROSECUTION ON THE MERITS IS CLOSED. THIS NOTICE OF ALLOWANCE IS NOT A GRANT OF PATENT RIGHTS. THIS APPLICATION IS SUBJECT TO WITHDRAWAL FROM ISSUE AT THE INITIATIVE OF THE OFFICE OR UPON PETITION BY THE APPLICANT. SEE 37 CFR 1.313 AND MPEP 1308.

THE ISSUE FEE AND PUBLICATION FEE (IF REQUIRED) MUST BE PAID WITHIN THREE MONTHS FROM THE MAILING DATE OF THIS NOTICE OR THIS APPLICATION SHALL BE REGARDED AS ABANDONED. THIS STATUTORY PERIOD CANNOT BE EXTENDED. SEE 35 U.S.C. 151. THE ISSUE FEE DUE INDICATED ABOVE DOES NOT REFLECT A CREDIT FOR ANY PREVIOUSLY PAID ISSUE FEE IN THIS APPLICATION. IF AN ISSUE FEE HAS PREVIOUSLY BEEN PAID IN THIS APPLICATION (AS SHOWN ABOVE), THE RETURN OF PART B OF THIS FORM WILL BE CONSIDERED A REQUEST TO REAPPLY THE PREVIOUSLY PAID ISSUE FEE TOWARD THE ISSUE FEE NOW DUE.

HOW TO REPLY TO THIS NOTICE:

I. Review the SMALL ENTITY status shown above.

If the SMALL ENTITY is shown as YES, verify your current SMALL ENTITY status:

A. If the status is the same, pay the TOTAL FEE(S) DUE shown above.

B. If the status above is to be removed, check box 5b on Part B - Fee(s) Transmittal and pay the PUBLICATION FEE (if required) and twice the amount of the ISSUE FEE shown above, or

If the SMALL ENTITY is shown as NO:

A. Pay TOTAL FEE(S) DUE shown above, or

B. If applicant claimed SMALL ENTITY status before, or is now claiming SMALL ENTITY status, check box 5a on Part B - Fee(s) Transmittal and pay the PUBLICATION FEE (if required) and 1/2 the ISSUE FEE shown above.

II. PART B - FEE(S) TRANSMITTAL, or its equivalent, must be completed and returned to the United States Patent and Trademark Office (USPTO) with your ISSUE FEE and PUBLICATION FEE (if required). If you are charging the fee(s) to your deposit account, section "4b" of Part B - Fee(s) Transmittal should be completed and an extra copy of the form should be submitted. If an equivalent of Part B is filed, a request to reapply a previously paid issue fee must be clearly made, and delays in processing may occur due to the difficulty in recognizing the paper as an equivalent of Part B.

III. All communications regarding this application must give the application number. Please direct all communications prior to issuance to Mail Stop ISSUE FEE unless advised to the contrary.

IMPORTANT REMINDER: Utility patents issuing on applications filed on or after Dec. 12, 1980 may require payment of maintenance fees. It is patentee's responsibility to ensure timely payment of maintenance fees when due.

PART B - FEE(S) TRANSMITTAL

**Complete and send this form, together with applicable fee(s), to: Mail Mail Stop ISSUE FEE
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450**

or Fax (571)-273-2885

INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

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Certificate of Mailing or Transmission

I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being facsimile transmitted to the USPTO (571) 273-2885, on the date indicated below.

(Depositor's name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/594,997	01/24/2007	Takahito Itoh	66296 / L550	3293

TITLE OF INVENTION: SOLID-STATE POLYMER ELECTROLYTE MEMBRANE, METHOD FOR MANUFACTURE THEREOF AND SOLID-STATE POLYMER ELECTROLYTE FUEL CELL THEREWITH

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	NO	\$1510	\$300	\$0	\$1810	06/30/2011

EXAMINER	ART UNIT	CLASS-SUBCLASS
HU, HENRY S	1764	429-033000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

- ☐ Change of correspondence address (or Change of Correspondence Address form PTO/SB-112) attached;
☐ "Fee Address" indication (or "Fee Address" Indication form PTO/SB-117; Rev 03-02 or more recent) attached. Use of a **Customer Number is required.**

2. For printing on the patent front page, list

- (1) the names of up to 3 registered patent attorneys or agents OR, alternatively, 1 _____
 (2) the name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed. 2 _____
 3 _____

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document has been filed for recordation as set forth in 37 CFR 3.111. Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE

(B) RESIDENCE: (CITY and STATE OR COUNTRY)

Please check the appropriate assignee category or categories (will not be printed on the patent): ☐ Individual ☐ Corporation or other private group entity ☐ Government

4a. The following fee(s) are submitted:

- ☐ Issue Fee
☐ Publication Fee (No small entity discount permitted)
☐ Advance Order - # of Copies _____

4b. Payment of Fee(s): (Please first reuply any previously paid issue fee shown above)

- ☐ A check is enclosed.
☐ Payment by credit card. Form PTO-2038 is attached.
☐ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment, to Deposit Account Number _____ (enclose an extra copy of this form).

5. **Change in Entity Status** (from status indicated above)

- ☐ a. Applicant claims SMALL ENTITY status. See 37 CFR 1.27. ☐ b. Applicant is no longer claiming SMALL ENTITY status. See 37 CFR 1.27(g)(2).

NOTE: The Issue Fee and Publication Fee (if required) will not be accepted from anyone other than the applicant; a registered attorney or agent; or the assignee or other party in interest as shown by the records of the United States Patent and Trademark Office.

Authorized Signature _____ Date _____

Typed or printed name _____ Registration No. _____

This collection of information is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, Virginia 22313-1450. **DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450.**

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DATE MAILED: 03/30/2011

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b) (application filed on or after May 29, 2000)

The Patent Term Adjustment to date is 647 day(s). If the issue fee is paid on the date that is three months after the mailing date of this notice and the patent issues on the Tuesday before the date that is 28 weeks (six and a half months) after the mailing date of this notice, the Patent Term Adjustment will be 647 day(s).

If a Continued Prosecution Application (CPA) was filed in the above-identified application, the filing date that determines Patent Term Adjustment is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Application Information Retrieval (PAIR) WEB site (<http://pair.uspto.gov>).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Customer Service Center of the Office of Patent Publication at 1-(888)-786-0101 or (571)-272-4200.

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Notice of Allowability

Application No.

10/594,997

Examiner

HENRY S. HU

Applicant(s)

ITOHO ET AL.

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to RCE of December 2, 2010.
2. ☒ The allowed claim(s) is/are 1,3 and 8.
3. ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some* c) ☐ None of the:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☒ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: ____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
- (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
- 1) ☐ hereto or 2) ☐ to Paper No./Mail Date ____.
- (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date ____.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☒ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3. ☒ Information Disclosure Statements (PTO/SB/08),
Paper No./Mail Date 12-2-2010
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application
6. ☐ Interview Summary (PTO-413),
Paper No./Mail Date ____.
7. ☐ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other ____.

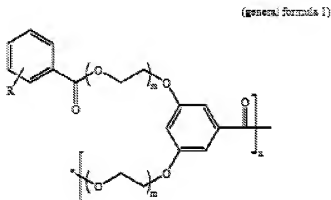
DETAILED ACTION

1. Applicants' **RCE Request** and one new **IDS** (1 page) filed on **December 2, 2010** are both received, which is in response to Allowance filed on September 2, 2010. Examiner has closely considered all the six patents and articles as specified in such new IDS. Three IDS' (total 5 pages) are filed accordingly. Examiner accepts Applicants' twelve drawing sheets with **Figures 1-11** (a brief description is on page 4). **Claims 1, 3 and 8 with only one independent claim (Claim 1)** are now pending. An action follows.

Allowable Subject Matter

2. Claims 1, 3 and 8 are allowed.
3. The following is an examiner's statement of reasons for allowance: The above claims 1, 3 and 8 are allowed over the closest references:
4. The limitation of "once-amended" parent **Claim 1** in present invention relates to a solid-state polymer electrolyte membrane, characterized in: that a primary constituent of which is a hyperbranched polymer having an acidic functional group disposed at a terminal of a side chain thereof.

According to its dependent **Claim 2** (now incorporated into parent Claim 1), said hyperbranched polymer is related to a poly (bis(oligo-ethylene glycol) benzoate) expressed by general **formula 1** below.



See other limitations of dependent **Claims 3 and 8**.

5. The previous Notice of Allowance filed on September 2, 2010 is now incorporated here by reference. In a close examination on the prior art as mentioned on the newly submitted IDS filed on December 2, 2010 along with a further examination and search, the examiner has found the following prior art did not teach the claimed limitation. Based on the fact that no further amendment is applied to this RCE/IDS, current parent **Claim 1** carries exact the same scope as the one allowed on September 2, 2010. The same rationale for previous allowance is thereby applied here accordingly.

6. The “polymer electrolyte membrane (PEM)” of parent **Claim 1** “comprises” a primary constituent of which is a hyperbranched polymer having an acidic functional

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group disposed at a terminal of a side chain thereof. Current amendment on parent **Claim 1** is in **two** ways including: (A) to incorporate dependent Claim 2 so that **a specific poly (bis(oligo-ethylene glycol) benzoate)** expressed by general **formula 1** is now used as hyperbranched polymer, and (B) to amend the typo in the formula 1 so as to overcome claim objection.

7. In a very close examination, such a hyperbranched polymer having formula 1 has an **acidic** functional group disposed at a terminal of a side chain, the “R” group in the pendent aromatic ring accordingly can be in **two** ways including: (A) **R is a functional group** directly attached on the aromatic ring, and (B) **R is a functional group-containing group** so that the attachment to the aromatic ring is via a connecting bivalent group.

8. As exactly pointed out by Applicants on pages 6-7 of Remarks, the involving **four** references including **Chen, Ito, Itoh and Colombo** in combination or alone cannot disclose or suggest such **a specific poly (bis(oligo-ethylene glycol) benzoate)** expressed by general **formula 1**. For one instance, the hyperbranched polymer’s formula 1 of parent Claim 1 now requires **the oligo-ethylene oxide terminal side chains are attached to benzene rings via ester linkage** (benzoate type). For the other instance, the present polymer is not just surface-functionalized with acidic terminal groups, as is the polymer of Colombo, but rather includes **acidic terminal groups distributed throughout the polymer**. Clearly, the molecular structure

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of such an acidic group-containing hyperbranched polymer via such a connecting group is novel and is not just an improvement from the prior art.

9. It is noted by this Examiner that even the reference has fundamentally disclosed most of the elements in the whole chemical structure and only a small difference is missing; it will still take a lot of efforts and/or plenty of turn-ups in achieving the claimed chemical structure. Different chemical structure will result at least somewhat different product such as solid-state polymer electrolyte membrane. Therefore, the references in combination or alone cannot disclose or suggest such a PEM as discussed above.

10. After examining a total of six US patents and/or articles (A)-(F) as cited in the newly submitted IDS, they do not disclose the claimed solid-state polymer electrolyte membrane (PEM). The examination result can be summarized as:

(A) US 5,114,809 to Nakacho et al. only discloses using a compound having a formula $\{[N=P(E)_2]_a(LiX)_b\}_n$, wherein $[N=P(E)_2]$ is an oligoethyleneoxypolyphosphazene such as Formulae (I), (II) and (III), wherein inside Formula (I) and (III) each has a sulfonic acid end group. The oligo-ethylene oxide terminal side chains are attached to benzene rings via ester linkage (benzoate type) for carrying sulfonic acid group is not disclosed or suggested. See abstract and title.

(B and C) **CN 1385464 A to Cui or its equivalent WO 02/92638 A1 to Cui** each only relates to organic composite material. It can be inorganic polymer material B dispersed in specific polymer with nanoparticle form. It also can be organic polymer material B filled in perforated and reticular polymer material C. See abstract and specification. Cui does not disclose or suggest using the claimed hyperbranched polymer having formula I has an acidic functional group disposed at a terminal of a side chain. Particularly **the oligo-ethylene oxide terminal side chains are attached to benzene rings via ester linkage** (benzoate type).

(D, E and F) The same problem can be applied to other three patent and/or article including: **JP 2004-087137 to Kamiyama, KR 2008-003475317 (Korean abstract only), and CN 2005-80012249.3 to Itoh et al.** None discloses or suggests the claimed hyperbranched polymer having formula I has an acidic functional group disposed at a terminal of a side chain. Particularly **the oligo-ethylene oxide terminal side chains are attached to benzene rings via ester linkage** (benzoate type).

In summary, the above references (which are mentioned before) and new six references, in combination or alone, fail to teach or fairly suggest the limitations of present invention.

11 After further examination and search, the examiner found the following prior art did not teach the claimed limitation:

US 7,038,004 B2 to Chen et al. only discloses the polymerization process of making fluorinated poly(arylene ethers) with pendant crosslinkable groups. See title, abstract and Figures 5 and 6. Although the fluorinated polymers can be counted as hyperbranched polymer according to the art, they are not sulfonated at all on the aromatic rings. Additionally, the **oligo-ethylene oxide terminal side chains attached to benzene rings via ester linkage** is not disclosed or suggested. Therefore, Chen fails to teach or fairly suggest the solid electrolyte membrane limitation of “once-amended” parent Claim 1.

12 As of the date of this office action, the examiner has not located or identified any reference that can be used singularly or in combination with another reference including the above references to render the present invention anticipated or obvious to one of the ordinary skill in the art. Therefore, the only one independent composition **Claim 1** is allowed for the reason listed above. Since the prior art of record fails to teach the present invention, the remaining pending dependent **Claims 3 and 8** are passed to issue.

13. Any inquiry concerning this communication or earlier communication from the examiner should be directed to **Dr. Henry S. Hu** whose telephone number is **(571) 272-1103**. The examiner can be reached on Monday through Friday from 9:00 AM –5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner’s supervisor, Dr. Vasu Jagannathan, can be reached on (571) 272-1119. The fax number for the

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organization where this application or proceeding is assigned is **(571) 273-8300** for all regular communications.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/Peter D. Mulcahy/
Primary Examiner, Art Unit 1762

/Henry S. Hu/
Examiner, Art Unit 1764

March 13, 2011